Draft PBT Rule

Chapter 173-333 WAC

PBT Rule Advisory Committee Review Draft
December 8, 2004

Part I - General Provisions

WAC 173-333-100 Introduction

Persistent, bioaccumulative toxins (PBTs) are chemicals that pose a unique threat to human health and the environment in Washington state. They remain in the environment for long periods of time, are hazardous to the health of humans and wildlife, can build up in the food chain, and can be transported long distances and readily move between air, land and water media.

Because of the unique threat that these PBTs pose, special attention is necessary to identify actions that will minimize or eliminate threats to human health and the environment. While there are a variety of regulatory and non-regulatory activities that address the uses and releases of PBTs, there remains a need to address these chemicals through specific measures in order to fully achieve significant and measurable reductions over time to further protect current and future generations of Washingtonians.

The goal of this chapter is to manage, reduce or eliminate the uses and releases of PBTs in Washington through the following means:

- Specific chemical action plans developed for listed PBTs,
- Continued environmental monitoring,
- Increased public awareness, and
- Promotion of voluntary reduction measures.

WAC 173-333-110 What is the Purpose of this Chapter?

(1) The purpose of this chapter is to:

(a) Establish criteria Ecology will use to identify persistent bioaccumulative toxins that pose human health or environmental impacts in Washington State;

(b) Establish a list of persistent bioaccumulative toxins.

(c) Establish procedures Ecology will use to review and periodically update the list;

(d) Establish criteria for selecting persistent bioaccumulative toxins for which Ecology will prepare chemical action plans;

(e) Define the scope and content of chemical action plans and establish the process Ecology will use to prepare those plans, and;

(f) Define the processes Ecology will use to coordinate the implementation of this chapter with the Department of Health and other state agencies.

WAC 173-333-120 Applicability

(1) This chapter applies to the Department of Ecology (Ecology). This chapter does not impose new requirements on persons using or releasing PBTs, and it does not create new authorities nor does it constrain existing authorities for Ecology.

(2) This chapter provides for public involvement opportunities to participate in the Ecology processes for identifying PBTs and developing recommendations on measures to address uses and releases of PBTs.

WAC 173-333-130 Exemptions to the PBT list

Any pesticide with a valid registration on [insert date of rule adoption] that has been issued by the Environmental Protection Agency under the Federal Insecticide Fungicide and Rodenticide Act, 7 U.S.C. 136 et seq., or any fertilizer regulated under the Washington Fertilizer Act, chapter 15.54 RCW, will not be included on the persistent bioaccumulative toxin list established under this chapter.

WAC 173-333-140 Administrative Principles

(1) **Scientific information**. Ecology will base decisions on PBTs on sound public policy and credible scientific information. However, Ecology believes that lack of full scientific consensus should not be used as a justification for delaying reasonable measures to prevent or minimize harm to human health or the environment.

(2) **Public involvement.** Ecology will provide opportunities for public involvement during the decision-making processes for identifying PBTs and preparing a CAP.

(3) **Clear documentation**. Ecology will provide clear and understandable descriptions and rationale for decisions implementing this chapter.

(4) **Predictability**. Ecology will implement this chapter in ways that allow stakeholders, interest groups, and the public to plan their participation in decision-making processes and future responses to recommendations that result from those processes.

(5) **Coordination.** Ecology will coordinate with other state agencies and local governments, tribes, and interested parties in the development and implementation of CAPs and when revising the PBT List.

(6) **Rule Amendments.** When amending any portion of this rule, Ecology will follow the requirements of the Administrative Procedures Act (APA) – Chapter 34.05 RCW.

PART II - Definitions

WAC 173-333-200 Definitions

"Administrative Procedures Act" or "APA" means the Washington Administrative Procedures Act, RCW 34.05.

"Bioaccumulation" means the process by which substances increase in concentration in living organism as they take in contaminated air, water, soil, sediment or food because the substances are very slowly metabolized or excreted**.**

"Bioaccumulation factor" or "BAF" means the ratio of the concentration of a chemical in an organism to the concentration of the chemical in the surrounding environment. The BAF is a measure of the extent to which the organism accumulates the chemical as a result of uptake through ingestion as well as contact from contaminated media, such as water.

"Bioconcentration factor" or "BCF" means the ratio of the concentration of a chemical in an organism to the concentration of the chemical in the surrounding environment. The BCF is a measure of the extent of chemical partitioning between an organism and the surrounding environment.

"Carcinogen" means any chemical that causes or aggravates cancer.

"Chemicals" means a naturally occurring element, mixture, or group of organic and inorganic compounds that is produced by or used in a chemical process.

"Chemical group" means a grouping of chemicals which share a common chemical structure.

"Chemical Action Plan" or "CAP" means a plan that identifies, characterizes and addresses uses and releases of a specific PBT or a group of PBTs and facilitates implementation of measures to manage, reduce or eliminate such uses and releases.

"**Credible Scientific Information**" means information that is based on a theory or technique that is generally acceptable in the relevant scientific community or has been collected or derived using standard methods and protocols and appropriate quality assurance and control procedures.

"Cross-media Transfer of Chemicals" means the movement of a chemical from one medium, such as air, water, soil, or sediment, to another.

"Degradation" means the processes by which organic chemicals are transformed into derivative chemicals and ultimately broken down.

"Ecology" means the Department of Ecology.

"Environment" means any plant, animal, natural resource, surface water (including underlying sediments), ground water, drinking water supply, land surface (including tidelands and shorelands) or subsurface strata, or ambient air.

"Environmental half-life" means the time required for the concentration of a chemical to diminish to half its original value. The environmental half-life of a chemical is a measure of a chemical's persistence in the environment.

"Feasible" means capable of being accomplished or brought about or capable of being utilized or dealt with successfully.

"Log-octanol water partition coefficient" or "Log K_{ow}" means the ratio of a chemical's concentration in the octanol phase to its concentration in the aqueous phase of a two-phase octanol/water system as expressed in a logarithmic format.

"Manage, reduce or eliminate" means actions to reduce the uses and releases of PBTs and may include process changes designed to reduce or eliminate PBT generation and releases or product substitution to eliminate uses and releases.

"Media or Medium" means a component of the environment (air, water, soil or sediment) in which a contaminant is measured and an organism lives its life, and from which an organism can accumulate contaminants.

"Persistent bioaccumulative toxin" or "PBT" means a chemical or chemical group that meets or exceeds the criteria for persistence, bioaccumulation and toxicity criteria established in this chapter.

"**Persistence"** means the tendency of a chemical to remain in the environment without transformation or breakdown into another chemical form. It refers to the length of time a chemical is expected to reside in the environment and be available for exposure.

"**Sensitive Population Group**" means (a) groups of people that exhibit a different or enhanced response to a PBT than most people exposed to a similar level of the PBT because of genetic makeup, age, nutritional status or exposure to other toxic substances and/or (b) groups of people that are at greater risk because they have a higher potential for exposure than the general population.

"Toxicity" means the degree to which a substance or mixture of substances can harm humans, plants or wildlife.

Part III – The PBT List and Criteria and Procedures for Revising the List

WAC 173-333-300 What is the purpose of the PBT List?

(1) **Purpose**. The purpose of the PBT List is to identify chemicals that require further action because they remain ("persist") in the environment for long periods of time where they can bioaccumulate to levels that pose threats to human health and environment in Washington.

(2) **Intended uses of the PBT List**. Ecology will use the PBT List in the following ways:

a. **Chemical action plans**. Ecology will use the PBT List to select chemicals for chemical action plan development.

b. **Ambient monitoring**. Ecology will use the PBT List to help guide decisions on the design and implementation of Ecology programs for characterizing chemical concentrations in the ambient environment.

c. **Public awareness**. Ecology will use the PBT List to promote greater public awareness on the problems associated with PBT chemicals, the uses and sources of individual PBTs and steps that individuals and organizations can take to reduce PBT uses, releases and exposure.

d. **Voluntary measures**. Ecology will use the PBT List to help identify opportunities for government agencies, businesses and individuals to implement voluntary measures for reducing and phasing out PBT uses and releases.

(3) **Relationship to actions addressing chemical uses and releases**. Ecology has determined that the chemicals on the PBT List pose a potential threat to human health and the environment in Washington.

a. Ecology's decision to include a particular chemical on the PBT List does not represent a decision that all uses and releases of that chemical should be reduced or phased out.

b. Ecology does not intend to use the PBT List as the sole basis for establishing discharge monitoring requirements that are not required under current permits. Ecology will evaluate and, if appropriate, prepare recommendations for additional monitoring requirements when preparing chemical action plans (WAC 173-333-420 and -430).

WAC 173-333-310 What chemicals or chemical groups are included on the PBT List?

(1) **Purpose.** This section identifies the chemicals and chemical groups that Ecology has determined meet the criteria specified in WAC 173-333-320.

(2) **PBT List**. Ecology has determined that the following chemicals or chemical groups meet the criteria specified in WAC 173-333-320.

Aldrin/Dieldrin	309-00-2/60-57-1
*Cadmium (pending review of bioavailability)	7440-43-9 (a)
Chlordane	57-74-9
Chlordecone (Kepone)	3734-48-3
DDT, p,p'-	50-29-3
Endrin	72-20-8
Heptachlor/Heptachlor epoxide	76-44-8/1024-57-3
Hexabromobiphenyl	36355-01-8
Hexabromocyclododecane	25637-99-4
Hexachlorobenzene	118-74-1
Hexachlorobutadiene	87-68-3
*Lead (pending review of bioavailability)	7439-92-1 (b)
Mercury	7439-97-6
Mirex	2385-85-5
Perfluorooctane sulfonates (PFOS)	(c)
Pentachlorobenzene	608-93-5
Polycyclic aromatic hydrocarbons (PAHs)	(d)
Polybrominated dibenzo-p-dioxins and dibenzofurans (PBDD/PBDF)	(e)
Polybrominated diphenyl ethers (PBDEs)	(f)
Polychlorinated biphenyls (PCBs)	1336-36-3
Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF)	(g)
Polychlorinated napthalenes (PCN)	70776-03-3 (h)
Short-chain chlorinated paraffins (SSCP)	85535-84-8 (i)
Tetrabromobisphenol A	79-94-7
Tetrachlorobenzene, 1,2,4,5-	95-94-3
Toxaphene	8001-35-2

Please refer to the Explanatory Notes at the end of this draft regarding a – i above.

(3) **Categories**. Ecology will assign each chemical on the PBT List to one of the following three categories:

a. **Category** 1: Ecology will place chemicals in this category if the department determines that the chemical is used, released or present in Washington.

b. **Category 2:** Ecology will place chemicals in this category if the department determines that there is insufficient information to reach a conclusion on whether the chemical is used, released or present in Washington.

c. **Category 3**: Ecology will place chemicals in this category if the department determines that (i) all uses and releases of the chemical are prohibited under other state or federal laws or regulations or (ii) there are no feasible measures for reducing or phasing out uses and releases of the chemical beyond levels required under other federal and state laws and regulations, or (iii) is not present in Washington's environment.

(4) **Revising the PBT List**. Ecology will periodically review and, as appropriate, revise the PBT List in subsection (2) using the criteria and procedures in WAC 173-333-320 through -340.

WAC 173-333-320 What criteria will Ecology use to identify and add chemicals or chemical groups to the PBT List?

(1) **Purpose**. This section describes the criteria that Ecology will use to determine whether a chemical or group of chemicals should be included on the PBT List.

(2) **Criteria for identifying PBTs**. A chemical or group of chemicals will be included on the PBT List if Ecology determines it meets each of the following criteria:

(a) **Persistence**. The chemical or chemical group can persist in the environment based on evidence that:

(i) The half-life of the chemical in water is greater than or equal to sixty (60) days; or

(ii) The half-life of the chemical in soil is greater than or equal to 60 days; or

(iii) The half-life of the chemical in sediments is greater than or equal to 60 days; and

(b) **Bioaccumulation**. The chemical or chemical group has a high potential to bioaccumulate based on evidence that the bioconcentration factor or bioaccumulation factor in aquatic species for the chemical is greater than 1000 or, in the absence of such data, that the log-octanol water partition coefficient (log K_{ow}) is greater than five (5); and;

(c) **Toxicity**. The chemical or chemical group has the potential to be toxic to humans or plants and wildlife based on evidence that:

i. The chemical or a chemical group is known to cause or can reasonably be anticipated to cause cancer or teratogenic effects, reproductive effects, neurological disorders or other acute or chronic health effects; or

ii. The chemical or chemical group is known to cause or can reasonably be anticipated to cause adverse effects in aquatic and terrestrial plants and animals.

(d) **Additional criteria applicable to metals:** The chemical or chemical group is a metal and Ecology determines that it is likely to be present in forms that are bioavailable.

(3) **Degradation products**. Ecology will consider both the chemical and its degradation products when making decisions on whether a chemical meets the criteria in subsection (2) of this section. If the chemical or chemical group meeting the criteria in subsection (2) results from the degradation or transformation of a parent substance, Ecology may also include the parent substance on the PBT List.

WAC 173-333-330 What criteria will Ecology use to remove a PBT from the PBT List?

(1) Purpose. This section describes the criteria and factors Ecology will use to determine whether a chemical or group of chemicals should be removed from the PBT List.

(2) Criteria for removing a chemical from the PBT list. Ecology will remove a chemical or chemical group from the PBT List if the department determines that credible scientific information developed subsequent to the listing decision provides evidence that the chemical or chemical group does not meet the PBT criteria in WAC 173-333-320(2).

WAC 173-333-340 What process will Ecology follow for revising the PBT List?

(1) **Purpose.** This section describes the processes Ecology will use to notify the public and amend the PBT list after making a determination that chemicals or groups of chemicals should be added or removed from the PBT List.

(2) Reviewing and updating the PBT list: Ecology will review and, as appropriate, update WAC 173-333-310 at least once every four years. The frequency of review will be determined by credible scientific information available on individual chemicals or chemical groups, rulemaking petitions submitted to Ecology, and available agency resources. Ecology will comply with the requirements for reviewing and responding to rulemaking petitions in the Administrative Procedures Act, Chapter 34.05 RCW.

(3) **Public notification.** If Ecology makes a preliminary determination that a chemical should be added or removed from the PBT List, it will notify the public through an announcement posted on the Ecology website and published in the state register.

(4) **Amending the PBT List.** If Ecology makes a final determination that a chemical or chemical group should be added or removed from the PBT List, the department will initiate actions to amend WAC 173-333-310 through formal rulemaking.

Part IV - Chemical Action Plans (CAPs)

WAC 173-333-400 What is a chemical action plan (CAP)?

(1) A chemical action plan (CAP) is a plan that identifies, characterizes and evaluates uses and releases of a specific PBT or a group of PBTs and includes recommendations on actions to protect human health or the environment.

(2) CAPs will include recommendations on the following types of actions:

a. Actions to reduce and phase-out uses and releases of the specific PBT or group of PBTs addressed in the CAP;

b. Actions to manage the disposal of products or waste that contain the specific PBT or group of PBTs addressed in the CAP;

c. Actions to minimize exposure to the specific PBT or group of PBTs; and

d. Actions to collect additional information needed to evaluate the feasibility of potential actions

e. Actions to measure or monitor the effectiveness of actions being implemented in Washington.

WAC 173-333-410 What evaluation factors and processes will Ecology use to select PBTs for chemical action plan preparation?

(1) **Purpose.** The purpose of this section is to describe the evaluation factors and processes Ecology will use to decide when to develop a chemical action plan for a particular chemical or group of chemicals included on the PBT list.

(2) **Candidates for CAP development.**. Ecology will consider developing chemical action plans for chemicals on the PBT list that meet the following criteria:

a. Ecology determines that the chemical or chemical group has a half-life in soil or sediment that is greater than or equal to 180 days; and

b. Ecology determines that the chemical or chemical group has a bioconcentration factor or bioaccumulation factor in aquatic species that is greater than 2000

(3) Decision-making process: Ecology will consult with the Department of Health to select the chemicals for chemical action plan preparation. The process for deciding when to prepare a chemical action plan for a particular chemical or group of chemicals includes the following:

a. Selection factors. Ecology will consider the following factors when deciding whether to prepare a chemical action plan for a particular chemical or group of chemicals identified in WAC 173-333-310(2):

i. Relative ranking. The relative ranking assigned to each PBT based on Ecology's evaluation of information on PBT characteristics, uses of the chemical in Washington, releases of the chemical in Washington, and the levels of the chemical present in the Washington environment.

ii. Opportunities for reductions. Whether there are opportunities for reducing or phasing out uses, production or releases of the PBT in Washington. In reviewing available information, the agencies shall consider whether more than one PBT is present in particular products, generated in particular processes or released from particular sources (co-occurring chemicals).

iii. Multiple chemical releases and exposures. Scientific evidence on the combined effects of exposure to one or more PBTs and other substances commonly present in the Washington environment.

iv. Sensitive population groups. Scientific evidence on the susceptibility of various population groups and the potential for elevated exposure to the particular PBT chemical.

v. Existing plans or regulatory requirements. Whether there are existing plans or regulatory requirements that reduce and phase-out uses and releases of a particular PBT or group of PBTs.

b. Preliminary selection. Ecology will prepare a written summary of the preliminary decision to prepare a chemical action plan for one or more chemicals and the rationale for selecting that particular chemical or group of chemicals.

c. Public notice and comment. Ecology will notify the public when it makes a preliminary selection and provide an opportunity for public review and comment. Ecology will notify the public through an announcement published in the Washington state register and posted on the Ecology website. Ecology will also send a written announcement to interested persons and organizations. Ecology will provide sixty days, from the date the notice is published in the Washington state register for the public to review and submit comments on the preliminary selection.

d. Final decision. Ecology will review all public comments on the preliminary selection prior to making a final decision to prepare a chemical action plan for a particular chemical or groups of chemicals. Ecology will notify the public of the final decision through an announcement published in the Washington state register and posted on the Ecology website. Ecology will also provide written notification to individuals or organizations who submitted comments on the preliminary selection.

WAC 173-333-420 What are the contents of a CAP?

(1) **Contents of the chemical actions plans**: Chemical action plans will include, as appropriate, the following types of information, evaluations and recommendations:

(a) **General chemical information**. General information including, but is not limited to, chemical name, properties, uses and manufacturers.

(b) **Life cycle analysis**. An analysis of the chemical's life cycle including production, unintentional production, uses and disposal. This will include estimates on the amount of each PBT used and released from various sources or activities in Washington and other sources that may contribute to exposures in Washington.

(c) **Human health and environmental impacts**. An evaluation of the potential impacts on human health and the environment associated with the use and release of the PBT chemical. This will include consideration of available information on the levels of the PBT present in Washington's environment, the likely fate and transport mechanisms, available body-burden data, toxicological effects, and the incidence of diseases that have been associated with exposure to the particular PBT.

(d) **Current management approaches.** An evaluation of the regulatory and non-regulatory approaches that influence production, uses, releases and management of each PBT.

(e) **Identification of policy options**. A list of options for managing, reducing or phasing out the different uses and releases of the PBTs addressed in the CAP. The range of options for particular uses and releases shall include:

(i) A no-action option;

(ii) An option that results in the phase-out of PBT uses and releases; and

(iii) Other options, including the use of available substitutes, that will enable full consideration of the opportunities and constraints for reducing particular uses, releases and exposures.

(f) **Recommendations:** The recommendations will include:

(i) Recommendations on actions to manage, reduce or phase-out uses and releases of the PBT addressed in the CAP. The recommendations will be based on an evaluation of the following factors:

(A) Feasibility of implementing the action;

(B) Environmental and human health benefits associated with implementing the action;

(C) Economic impacts associated with implementing the action; and

(D) Consistency with existing federal and state regulatory requirements.

(ii) A description of the steps Ecology will take to implement the CAP, including a description of:

(A) The existing resources and necessary additional budget Ecology intends to use;

(B) How Ecology intends to inform and educate affected persons about the CAP; and

(C) How Ecology will promote and assist voluntary actions.

(iii) Performance Measures: A description of interim milestones to assess progress and the use of objectively measurable outcomes, including recommendations for environmental and human health monitoring to measure levels of the chemical(s) (in the CAP) over time.

(g) Other: Other information that Ecology determines is necessary to support the decision-making process.

(2) Regulatory consistency: When evaluating the consistency with existing federal and state regulatory requirements under subsection (1)(f)(i)(D) above, Ecology will:

(a) Ensure that the recommendations do not violate existing federal or state laws;

(b) Determine if the recommendations would impose more stringent performance requirements on private entities than on public entities, unless already required to do so by federal or state law, and if so, describe the justification for doing so; and

(c) Determine if the recommendations differ from federal regulations and statutes, and if so, explain why the difference is necessary and how Ecology will coordinate with other federal, state, and local laws applicable to the same activity or subject matter.

(3) Economic analyses. In assessing economic impacts under subsection (1)(f)(i)(C), Ecology will evaluate the economic feasibility of implementing the recommendations. This may include an analysis of the probable benefits and costs of the CAP.

WAC 173-333-430 What process will Ecology use to develop CAPs?

(1) Purpose: The purpose of this section is to identify the process Ecology will use to develop CAPs.

(2)Workplan/Scoping: Once a chemical is selected for CAP development, Ecology will initially plan and scope the CAP of the selected chemical based upon available information regarding the chemical's products, uses and releases; human health exposure and ecological hazards; environmental releases, fate, and transport; environmental concentrations and available substitutes; available options for managing uses and releases; estimated costs of alternate management options; and any other information Ecology determines is necessary to support the CAP development process. Ecology will consult with the Department of Health regarding all portions of the CAP related to human health exposures.

(3) Advisory Committee: Ecology will create an external advisory committee for each CAP that Ecology develops. The purpose of the advisory committee is to provide stakeholder input and expertise.

(a) The advisory committee membership will include, but not be limited to representatives from: large and small business sectors, community, environmental and public health advocacy groups, local governments, and public health agencies. When appropriate, representatives from the following groups will also be invited to participate: agricultural groups, worker safety advocacy groups, and other interested parties. Federally recognized tribal governments will also be encouraged to participate. In addition, representation from other state executive agencies may be requested to provide input and to represent agency interests in the CAP development process. Outside experts (if needed) may be requested to provide technical expertise.

(b) A neutral-third party facilitator may be hired to facilitate advisory committee meetings.

(c) The advisory committee will follow a consultative process, where Ecology will draft the CAP in consideration of input from Advisory Committee members.

(d) All advisory committee meetings will be open to the public. Ecology will notify the public of advisory committee meetings through an announcement posted on the Ecology web site and written notification to interested individuals and organizations.

(4) Information Collection Phase: Ecology will collect all necessary and up-to-date information regarding the selected chemical. CAP Advisory committee members will be asked to contribute, and as appropriate, review information from Ecology during this phase of CAP development. The Department of Health will be asked to review any information related to human health.

(5) Draft Recommendations: Ecology will develop a draft CAP for advisory committee review and comment. Ecology will review all advisory committee comments and, as appropriate, revise the draft CAP prior to distributing it for public review and comment.

(6) Public Review and Comment: Ecology will notify the public when it has developed a draft CAP and provide an opportunity for public review and comment. The public comment period for each draft CAP will be a minimum of 60 days. Ecology will notify the public through an announcement posted concurrently on the Ecology website, a notice in the Washington State Register, and sent to interested persons and organizations. The comment period shall start from the date the notice is published in the Washington State Register. During the comment period, Ecology will hold a minimum of two public meetings on the draft CAP. One meeting shall be held on the western side of the state, and one meeting shall be held on the eastern side of the state. Ecology may hold additional public meetings during the public comment period if determined necessary.

(7) Final Recommendations: Ecology will review all public comments on the draft CAP prior to issuing the final recommendations. Ecology will notify the public of the final recommendations through an announcement published in the state register and posted on the Ecology website. Ecology will also provide written notification to individuals or organizations who submitted comments on the draft CAP.

Explanatory Notes Regarding Specific Chemicals on the PBT List (WAC 173-333-310)

a. **Cadmium**: Ecology has concluded that cadmium meets the criteria for persistence, bioaccumulation and toxicity in WAC 173-333-320(2). However, Ecology has not completed its review of information relevant to making a determination on whether cadmium is "...likely to be present in forms that are bioavailable..." (WAC 173-333-320(2)(d)). Ecology intends to complete that review and make a determination on whether to include cadmium on the PBT list prior to distributing the proposed rule for public review and comment.

b. **Lead**: Ecology has concluded that lead meets the criteria for persistence, bioaccumulation and toxicity in WAC 173-333-320(2). However, Ecology has not completed its review of information relevant to making a determination on whether lead is "...likely to be present in forms that are bioavailable..." (WAC 173-333-320(2)(d)). Ecology intends to complete that review and make a determination on whether to include lead on the PBT list prior to distributing the proposed rule for public review and comment.

c. **Perfluorooctane sulfonates (PFOS)**: PFOS (Molecular formula $C_8F_{17}SO_3$) is a member of a group of organic compounds that consists of an eight-carbon chain where the hydrogen atoms have been substituted with fluorine atoms and a reactive sulfonate group at one end of the chain. Ecology has determined that PFOS meets the draft PBT criteria in WAC 173-333-320(2). PFOS derivatives and salts include: acid (CAS 1763-32-1); ammonium salt (CAS 29081-56-9); diethanolamine salt (CAS 70225-14-8); lithium salt (CAS 29457-72-5); and potassium salt (CAS 2795-39-3).

d. **Polycyclic aromatic hydrocarbons (PAHs)**: PAHs are a group of compounds composed of two or more fused aromatic rings. Ecology has determined that the following PAH compounds meet the draft PBT criteria in WAC 173-333-320(2): dibenzo(a,h)anthracene (CAS 53-70-3); 3-methylchlolanthrene (CAS 56-49-5); benzo(r,s,t)pentaphene (CAS 189-55-9); dibenzo(a,h)pyrene (CAS 189-64-4); benzo(g,h,i)perylene (CAS 191-24-2); dibenzo(a,e)pyrene (CAS 192-65-4); indeno(1,2,3-cd)pyrene (CAS 193-39-5); 7H-dibenzo(c,g)carbazole (CAS 194-59-2); perylene (CAS 198-55-0); benzo(j)fluoranthene (CAS 205-82-3); benzo(b)fluoranthene (CAS 205-99-2); fluoranthene (CAS 206-44-0); benzo(k)fluoranthene (CAS 207-08-9); benzo(a)phenanthrene (CAS 218-01-9); dibenzo(a,j)acridine (CAS 224-42-0); and dibenzo(a,h)acridine (226-36-8).

e. **Polybrominated dibenzo-p-dioxins and dibenzofurans (PBDDs/PBDFs)**: PBDDs/PBDFs consist of two groups of tricyclic aromatic compounds with similar chemical and physical properties. Ecology has determined that the following PBDD/PBDF congeners meet the draft PBT criteria in WAC 173-333-320(2): 2,3,7,8-tetrabromodibenzo-p-dioxin (CAS 50585-41-6); 1,2,3,7,8-pentabromodibenzo-p-dioxin (CAS 109333-34-8); 1,2,3,4,7,8-hexabromodibenzo-p-dioxin (CAS 110999-44-5); 1,2,3,6,7,8-hexabromodibenzo-p-dioxin (CAS 110999-44-6); 1,2,3,7,8,9-hexabromodibenzo-p-dioxin (CAS 110999-44-7); 1,2,3,4,6,7,8-heptabromodibenzo-p-dioxin (CAS); 2,3,7,8-tetrabromodibenzofuran (CAS 67733-57-7); 1,2,3,7,8-pentabromodibenzofuran (CAS 107555-93-1); 2,3,4,7,8-pentabromodibenzofuran (CAS 131166-92-2); 1,2,3,4,7,8-hexabromodibenzofuran (CAS); 1,2,3,6,7,8-hexabromodibenzofuran (CAS 107555-94-2); 1,2,3,7,8,9-hexabromodibenzofuran (CAS); 2,3,4,7,8,9-hexabromodibenzofuran (CAS); 1,2,3,4,6,7,8-heptabromodibenzofuran (CAS 107555-95-3); 1,2,3,4,7,8,9-heptabromodibenzofuran (CAS).

f. **Polybrominated diphenyl ethers (PBDEs)**: PBDEs are a class of chemicals with the general chemical formula of $C_{12}H_{(9-0)}Br_{(1-10)}O$ with the sum of H and Br atoms always equal to 10. There are theoretically 209 congeners which can be divided into 10 congener groups (mono- through decabromodiphenyl ethers). Ecology has determined that the following congener groups meet the draft PBT criteria in WAC 173-333-320(2) and/or degrade to congeners that meet the draft PBT criteria in WAC 173-333-320(2): pentabromodiphenyl ether (CAS 32534-81-9); octabromodiphenyl ether (CAS 32536-52-0); decabromodiphenyl ether (CAS 13654-09-6).

g. **Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/PCDFs)**: PCDDs/PCDFs consist of two groups of tricyclic aromatic compounds with similar chemical and physical properties. Ecology has determined that the following PCDD/PCDF congeners meet the draft PBT criteria in WAC 173-333-320(2): 2,3,7,8-tetrachlorodibenzo-p-dioxin (CAS 1746-01-6); 1,2,3,7,8-pentachlorodibenzo-p-dioxin (CAS 40321-76-4); 1,2,3,4,7,8-hexachlorodibenzo-p-dioxin (CAS 39227-28-6); 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin (CAS 576-53-8); 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin (CAS 19408-74-3); 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (CAS 35822-46-9); 1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin (CAS 3268-87-9);): 2,3,7,8-tetrachlorodibenzofuran (CAS 51207-31-9); 1,2,3,7,8-pentachlorodibenzofuran (CAS 57117-41-6); 2,3,4,7,8-pentachlorodibenzofuran (CAS 57117-41-4); 1,2,3,4,7,8-hexachlorodibenzofuran (CAS 70648269); 1,2,3,6,7,8-hexachlorodibenzofuran (CAS 57117-44-9); 1,2,3,7,8,9-hexachlorodibenzofuran (CAS 72918-21-9); 2,3,4,7,8,9-hexachlorodibenzofuran (CAS 60851-34-5); 1,2,3,4,6,7,8-heptachlorodibenzofuran (CAS 67562-39-4); 1,2,3,4,7,8,9-heptachlorodibenzofuran (CAS 55673-89-7); 1,2,3,4,6,7,8,9-octachlorodibenzofuran (CAS 39001-02-0).

h. **Polychlorinated napthalenes (PCN)**: PCNs are a group chlorinated napthalenes that contain 1 to 8 chlorine atoms and are structurally similar to PCBs. Ecology has determined that the following compounds meet the draft PBT criteria in WAC 173-333-320(2): heptachloronaphthalene (CAS 32241-08-0); hexachloronaphthalene (CAS 1335-87-1); pentachloronaphthalene (CAS 1321-64-8); tetrachloronaphthalene (CAS 1335-88-2); and trichloronaphthalene (CAS 1321-65-9)

i. **Short-chain chlorinated paraffins (SSCP)**: SSCPs are chlorinated derivatives of n-alkanes that have carbon chains ranging from 10 to 13 carbon atoms and a chlorine content ranging from 50-70% by weight. Ecology has determined that SSCPs meet the draft PBT criteria in WAC 173-333-320(2).